



LESSON 23

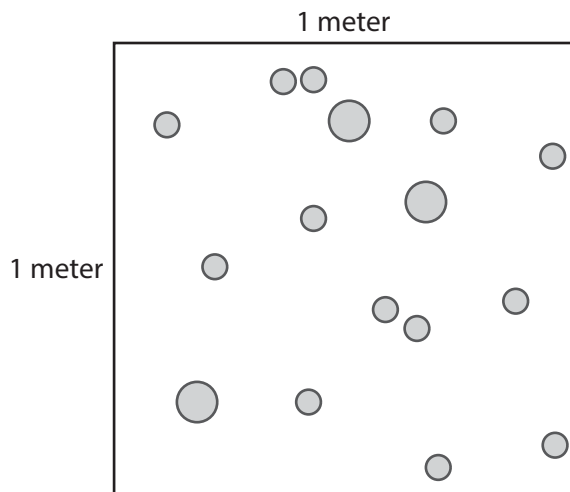
Quadrats

Your Challenge

- **You are working as a botanist. You need to know how many individual plants of different wildflower species are growing in a field.**

Scientists use random sampling to estimate the number of individuals in a population. For example, to study the plants in a large field, a botanist may take a 1 meter $\times$ 1 meter frame and place it over an area of the field that is representative of the larger field. The frame used is called a *quadrat*. Individual plants inside the quadrat are categorized and counted. The data are used to draw conclusions about the plant population of the entire field.

- **Use the quadrat sample below to draw conclusions about a field of wildflowers. The field is 300 meters long and 225 meters wide. Each large circle is one sunflower plant; each small circle is one yarrow plant.**





LESSON 23

Quadrats

- 1 How can you determine how many of each plant type you would expect to find in this field? How many sunflower plants would you expect? How many yarrow plants would you expect? Explain.

Possible answer: The quadrat that is sampled has an area of 1 square meter. I could find the area of the field in square meters, then multiply the number of square meters in the field by the number of each plant type in the 1 square meter of the sample. This should give me a good estimate of the number of each plant type in the entire field.

The area of the field is $300 \times 225 = 67,500 \text{ m}^2$.

Multiply the number of sunflower plants and yarrow plants in the quadrat by 67,500.

There are three sunflower plants in the quadrat.

I expect approximately $67,500 \times 3 = 202,500$ sunflower plants in the field.

There are 13 yarrow plants in the quadrat.

I expect approximately $67,500 \times 13 = 877,500$ yarrow plants in the field.

- 2 What are possible disadvantages to sampling the field using one randomly placed quadrat?

Possible answer: There may be places in the field that have only sunflower plants, only yarrow plants, or none of each. If the botanist took a sample from one of those areas, they would not be getting accurate information that represents the entire field.

- 3 To obtain a good sample, botanists follow a rule of covering 2% of the entire area with quadrats. How many square meters should be sampled to obtain a good sample of this field?

$0.02 \times 67,500 = 1,350$ square meters